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SELECTION CRITERIA FOR WARGAMERS

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## *Preface*

In the era of shrinking defense budgets it becomes increasingly important to select the right people for a given task and to train them as rapidly and economically as possible. While a great deal of historical analysis has been devoted to the issue of who makes the best warriors, until recently little scientific investigation of the topic has been attempted.

As a clinical psychologist, I am often consulted by commanders who must make decisions about personnel selection and retention issues. Psychological testing and evaluation of job performance often provide a basis for my recommendations. This led me to wonder whether some of these same social science tools and techniques might not be valuable in the selection of war fighters.

I am especially grateful for the assistance of Cols Hall and Ryals (present and past directors of the ACSC Prairie Warrior exercise). Their interest in and substantial support for this project have made it both possible and enjoyable for me. Similarly, I want to thank my faculty research advisor, Major Kathy Winters, who served as a valuable sounding board for my ideas. I am grateful to each of the 56 other participants, including the ACSC Commandant, Col Drennan and the ACSC Dean of Education, Col Dickson, who unselfishly consented to complete my questionnaire. I also wish to thank Lt Col Conn and his secretary, Mrs. Clow, who helped tabulate the Myers-Briggs data.

Last, but certainly not least, I want to express my appreciation to my daughter Megan who helped enter the data into the computer, and to my wife, Marcia, without whose support the project would not have been possible.



### ***Abstract***

Clausewitz's concept of "military genius" was operationalized and tested. Twenty subjects selected from a pool of 75 Air Command and Staff College students competing to participate in the air component of the 1997 Prairie Warrior exercise were compared to those not selected. Sternberg's Tacit Knowledge Inventory (TKIM) representing "military intellect" and Seligman's Attributional Style Questionnaire (ASQ) measuring "determination" were the primary instruments used in the study. Chi Square and MANOVA analyses indicate that the two student groups did not differ on demographic, Myers-Briggs Type data, the ASQ or the TKIM. However, significant differences were found between a comparison sample of senior military officers and the student groups on the TKIM. Similarly, trends in the expected direction were found on the ASQ. Restriction of range may have limited statistical power in the study.

## **Chapter 1**

### **Historical Examples of Military Genius**

The question of how to identify and cultivate great military leaders has bedeviled the armed forces for centuries. Clausewitz proposed two indispensable characteristics, writing that the mind must possess “first, an intellect that, even in the darkest hour, retains some glimmerings of the inner light which leads to truth; and second, the courage to follow this faint light wherever it may lead.”<sup>1</sup> Exploring past attempts to implement these characteristics and attempting to operationalize and apply them to contemporary setting is the focus of this paper.

#### **The German General Staff**

Dupay, in his book, *A Genius for War*, examines the German army in the 19<sup>th</sup> and 20<sup>th</sup> centuries in an effort to answer the following questions: (1) Why did the Germans have such great generals? (2) Why did the Germans demonstrate greater imagination and bolder initiative on the battlefield? (3) Why were the Germans consistently able to inflict greater casualties on the allies than they endured?<sup>2</sup>

In this same section, Dupay analyzes and rejects four possible explanations for German military success including, (1) German genetic superiority, (2) a greater inherent adaptability to military life, (3) Germany’s need to fight harder because of the threat to

the homeland, and (4) a high degree of methodological efficiency encouraged by German culture.<sup>3</sup>

Rather, Dupay argues that the success of the German military is explained by its creation of effective military institutions, among them the General Staff. “In military history, consistent performance comparable to that of the German armies in World Wars I and II can be found only in armies led by such military geniuses as Alexander, Hannibal, Caesar, Gustavus Adolphus, Genghis Khan, and Napoleon.”<sup>4</sup>

The German General Staff concentrated on the process of institutionalizing military excellence. They emphasized a multi-faceted approach, focusing on selection, examination, specialized training, historical studies, inculcation of the initiative, acceptance of responsibility, achieving technical-tactical perfection, and objectivity in analysis.<sup>5</sup>

However, while there is much good that can be said about the training for and operation of the General Staff, the fact remains that Germans lost both World Wars. The military brilliance evidenced by the development of blitzkrieg could not offset the cumulative effects of overestimations and miscalculations which led to the ill-fated invasion of Russia, and ultimate defeat.

### **General Claire Lee Chennault**

In a thoughtful paper filled with primary source material from members of the famed “Flying Tigers,” Lt Col Brown applies Clausewitz’s definition of “military genius” to General Chennault’s. In a time when daylight precision bombing was the “correct” doctrine, Chennault concentrated on enhancing the combat effectiveness of fighters. His

strong belief in the veracity of his position coupled with a dogged determination to see his plans implemented resulted in a stunningly successful air campaign in China during World War II.

Chennault had definite ideas about how to implement his theories in an air war against Japan. Consider this account of his considerable research.

Chennault needed to look not only at the Air Force but at China as well. He examined all aspects of the force finding significant internal problems. Chennault also discovered they could not fight because they lacked the proper training and equipment. Also, during these travels he spent considerable time studying and writing extensive notes on the weather, roads, railroad system, and navigable landmarks. Chennault also took movies of Japanese formations and filled his notebooks with comments on Japanese tactics. These books would become invaluable later. Most importantly, from this comprehensive analysis and investigation, Chennault built a personal foundation of support. He established relationships with the Chinese people irrespective of their status level; he determined sites for and started to built strategically located airfields; and he initiated his air raid warning system.<sup>6</sup>

One practical test of genius might be the capacity to understand a complex process (i.e., the “inner light that leads to truth”) AND the ability to communicate it to others. The high kill ratios and the success of the “Flying Tigers” provides evidence that Chennault both understood and communicated the “truth” regarding effective fighter tactics. More than fifty years later, one of Chennault’s pilots summarized his training in this way, “Chennault’s tactics were common sense. Always have top cover when possible. Line abreast flights of two when engaging zeros. Don’t try to turn with them. Head on passes. Hit [and] run then come back. Element of surprise. Above all don’t get lost and save enough fuel to get home.”<sup>7</sup>

Chennault’s determination (i.e., courage to follow the faint light of truth wherever it may lead) and insight into how to accomplish his mission is illustrated by the following

quotation. “My policy in dealing with the Chinese eventually boiled down to rolling with their punches and yielding on many minor, unimportant matters and always facing them down with a determined, stubborn stand on every major issue. It took a tremendous amount of time and energy, which many Americans were unwilling to expend on the Chinese, but in the end I felt it was worth it because it worked and enabled me to accomplish the things I wanted to do.”<sup>8</sup>

However, Chennault’s success with his men and with the Chinese stands in stark contrast to the failures he experienced in dealing with his superiors. General Holloway stated that Chennault “couldn’t get along with anybody above him unless they absolutely agreed with him. He didn’t know the meaning of the word compromise. ...He did not get up to the very top, which he would have, without any doubt, if he had just a bit more tact and the ability to get along whether he agreed or not. In other words, compromise a few points to make a little gain rather than a big loss. He didn’t understand it, didn’t do it; that’s why he got fired in the first place and shipped off to China where nobody would have ever heard of him.”<sup>9</sup> Thus, in the case of Chennault, it seems clear that brilliant ideas, when coupled with too much determination, can impair the successful manifestation of military genius.

### **Fog, Friction, and Military Genius**

The two examples considered briefly above suggest that military genius involves more than mechanically plugging numbers into an equation and thereby obtaining the correct solution. History suggests that being bright and working hard are necessary, but not sufficient to produce success in war.

Watts, in his analysis of US air doctrine stresses the importance of psychological variables arguing that “combat psychology constitutes the most stable, most timeless dimension of war. Despite the appearance of thermonuclear weapons and intercontinental delivery vehicles, the outcomes of battles still hinge, often as not, on the vision, determination, and courage of a comparatively small percentage of the combatants involved. Consequently, to choose anything except combat psychology as the basic context for the theory or practice of war is to build upon sand.”<sup>10</sup>

He is critical of the way strategic planning focused almost exclusively on the delivery of bombs and bullets without considering the effects of fog and friction on people engaged in the delivery process. He argues that a “relentless focus on combat psychology—on steeling soldiers and commanders at every echelon to withstand the terrible dangers, stresses, and uncertainties of actual combat—has largely been missing from basic American doctrinal writings on war.”<sup>11</sup>

Watts suggests a cognitive shift in the way we think about warfare. “Moving away from a mechanistic mindset that has dominated US air doctrine can help us cope with the total phenomenon of war more effectively. A deterministic *Weltanschauung* cannot help but neglect the uncertainties, chance occurrences, dangers, demands for exertion, and other frictions of actual conflict. In contrast, a more organic image, meaning one grounded on the psychology of battle and the pervasive reality of general friction, should encompass both the calculable and noncalculable aspects of war’s underlying processes more completely.”<sup>12</sup>

How could warfighters prepare themselves for these uncertainties? Watts suggests that the solution is “the same one Clausewitz outlined 150 years ago: “Do everything

necessary to select for, encourage, and support military genius.”<sup>13</sup> “From the Clausewitzian standpoint of viewing war as a clash of independent wills dominated by friction, therefore, I would argue that the kinds of practices that lay at the core of superior German fighting power throughout World War II are little more than military common sense. If, as Clausewitz maintained, military genius founded on battle experience is the most effective antidote to the incalculable frictions of real war, then it seems baseless to object to Clausewitz’s antidote on the grounds that we do not know exactly how to quantify this quality today.”<sup>14</sup>

The fact that Watts has no master plan for quantifying and applying the psychological components of Clausewitz’s antidote is understandable; he is a fighter pilot, not a psychologist. However, what he lacks in the ability to formulate an answer, he compensates for in helping to clearly articulate a ubiquitous problem in warfare. As technology advances, time and space on the battlefield are increasingly compressed. In this rapidly-changing battle space the effects of fog and friction can be exacerbated. The next chapter will review some contemporary approaches designed to help the modern warfighter more effectively manage the psychological effects of fog and friction.

### Notes

<sup>1</sup> Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J: Princeton University Press, 1976), p. 112.

<sup>2</sup> Dupay, T.N. *A Genius for War: The German Army and General Staff, 1807-1945*. (Falls Church, VA: Nova Publications, 1984), p. 300.

<sup>3</sup> Ibid.

<sup>4</sup> Ibid., p. 302.

<sup>5</sup> Ibid., p. 303.

<sup>6</sup> Philip N. Brown, *Claire Lee Chennault: Military Genius*. Research Paper, (Maxwell Air Force Base, AL), p. 23.

<sup>7</sup> Joe Summney, letter to the author, 9 January 1995, cited in Ibid., 30.

## Notes

<sup>8</sup> Claire Lee Chennault, *Way of a Fighter*, edited by Robert Holz. (New York, New York: G.P. Putnam's Sons, 1949), p. 78.

<sup>9</sup> General Bruce K. Holloway, USAF Oral History Interview #K239.0512-955, 16-18 August 1977, cited in Brown, p. 43.

<sup>10</sup> Watts, Barry D. *The Foundations of US Air Doctrine: The Problem of Friction in War*. (Maxwell AFB, AL: Air University Press, 1984), p. 112.

<sup>11</sup> *Ibid.*, p. 115.

<sup>12</sup> *Ibid.*, p. 116.

<sup>13</sup> *Ibid.*, p. 117.

<sup>14</sup> *Ibid.*, pp. 118-119.



## **Chapter 2**

### **The Role of Psychology in Assessing Military Genius**

Psychologists refer to the study of how people make decisions, plan, and problem solve as cognitive science. The purpose of this section is not to critique or to review extensively the literature in this area, but rather to provide illustrative examples of the kinds of research being conducted.

In recent years Army research psychologists, recognizing the increasing cognitive load precipitated by an increasingly fluid and multidimensional battlefield, have sought to understand and to measure military command decision making expertise. Toward this end, Michel and his associates used the (relatively) experimentally controlled environment of a war game to develop theories of military commanders' cognitive strategies. They were interested in understanding how battle space constructs affected outcome.<sup>1</sup>

Another Army psychologist, Fallesen, was interested in how commanders manage lack of information and uncertainty in a battlefield scenario. Fallesen employed a battery of cognitive instruments and developed a series of vignettes which he then administered to a sample of Army officers.<sup>2</sup> A representative vignette is as follows:

Imagine that you are the Commander of 2-6 Infantry, 1<sup>st</sup> Brigade. The last you knew, friendly forces held a key bridge and river line. Tomorrow the Division begins a major offensive across the river, with your battalion

spearheading the attack starting at 0400. Right now it is 2000 and you are moving north to an assembly area as shown in the diagram on the next page [not included in this paper]. On the way you receive reports that enemy infantry is occupying your assembly area and is continuing to reinforce. The size is unknown but estimated to be at least a company. Another surprising report indicates there is no sign of friendly forces at the river or the bridge. What do you do?

In a more educational vein, Fallesen also developed a 12-hour, six-lesson course on thinking, reasoning, and decision making for the Battle Command component of the Army Command and General Staff School.<sup>3</sup> The course included such topics as the effect of attitudes on thinking, perspective broadening, thinking adaptation, identifying hidden assumptions, resolving uncertainty through reasoning, and integrating complex and disparate factors.

In summary, military psychologists are acutely aware that fog and friction degrade performance in warfare. Cognitive science provides both the theory and the tools whereby the warfighter's performance can be enhanced.

## **The Present Study**

While the previous studies (reviewed above) are theory-based, they flows from *psychological* theory, which was developed outside the realm of war fighting. In this present study, the author decided to begin instead with *military* theory, with the idea that a “bottom up” rather than a “top down” approach might yield interesting results. Thus, a literature search was conducted to identify sound, empirically-validated psychological measures of Clausewitz's components of military genius: intellect and determination.

## Measures of Intelligence

Historically, psychologists have operationalized the measurement of intellect in terms of Intelligence Quotient (IQ). While IQ tests have excellent validity and reliability, they tend to do a better job of predicting school performance than success in the work place. (This is not really surprising since these scales were originally designed to assist with the proper placement of children in schools). In fact, even in the best of conditions, IQ scores accurately predict only about 25 percent of job-related success.<sup>4</sup>

In contrast, Sternberg and his associates have theorized that “practical” intelligence might help in explaining job success (or lack thereof). Their emphasis on accurately measuring “common sense” fits nicely with both Dupay and Watts who believed that military genius involved applied common sense. Illustrative of the kind of phenomenon Sternberg and his associates attempt to measure is the following vignette.

Consider the plight of the garbage collector, particularly in Tallahassee, Florida. If it is not enough that the summer heat makes any outdoor work unbearable, the city of Tallahassee adds insult to injury. Priding itself on the service it provides its citizens, Tallahassee requires physical labor far beyond the ordinary lifting and tossing of the standard-sized garbage cans placed carefully at the curbside in other cities. In Tallahassee, each household fills a huge, city-issued trash container kept in its backyard. Trash collectors are required to locate and retrieve each full container from each backyard, heave them into the truck, and then drag back the empty containers to each yard.

Many of the garbage collectors are young high school dropouts who, because of their lack of education, might not be expected to do well on intelligence tests. And on the surface, the job appears to be physically but not intellectually challenging. Each stop simply requires two trips to the backyard, one to retrieve the full can, another to replace it when empty. Or so we thought.

After observing this collection routine one summer, we noticed that a new, older man joined the crew, and the routine changed. The change involved relaxing the constraint that each household retain the same garbage

container. After all, the trash bins are identical, issued by the city rather than purchased with personal funds. The new routine consisted of wheeling the last house's empty can into the current house's backyard, leaving it to replace the full can that was in turn wheeled to the truck to be emptied. Once emptied, this can was now wheeled to the backyard of the next household to replace its full can, and so on. What had required two trips back and forth to each house now required only one. The new man's insight cut the work nearly in half.

What kind of intelligence enables a person to come up with this kind of strategy for reducing effort by half, a strategy that had eluded well-educated observers such as the present authors, other garbage collectors, and the managers who trained them?<sup>5</sup>

### **Tacit Knowledge**

This example is one of many which could be cited to illustrate that "street smarts" or practical IQ is not the same as "book smarts" or academic IQ. From this perspective, Sternberg and his associates propose the concept of "tacit knowledge."<sup>6</sup> Tacit knowledge is procedural. It is related to action and takes the form of "knowing how" rather than "knowing what." It is always associated with particular uses in a particular situation. It is practically useful and is employed to help achieve goals that people care about personally. It is also usually acquired on one's own, typically because there is low environmental support for its acquisition (i.e., as in the garbage collection example above). However, because this knowledge is acquired alone, in a competitive environment the discoverer is sometimes the beneficiary of a comparative advantage.

Undoubtedly, the reader can think of at least one example of an acquaintance who was highly successful in high school or college, but who then failed miserably in graduate school or the work place where independent study or interpersonal relationships, instead of multiple choice exams, became the measure of success. Sometimes these unfortunates

are disparagingly referred to as “educated idiots” or illustrations of the “Peter Principle.” Within the military, individuals with a high degree of tacit knowledge are sometimes characterized as “having cracked the code” or being a “fast burner.”

### **Empirical Studies**

Tacit knowledge has been reliably measured among business managers<sup>7</sup>, academic psychologists<sup>8</sup>, and Air Force basic trainees<sup>9</sup>. In each case, tacit knowledge was minimally correlated with IQ and was positively correlated with job success, even after demographic variables such as education were taken into account.

### **Military Examples of Tacit Knowledge**

A myriad of examples of tacit knowledge can be found in military history. Sun Tzu’s *Art of War*<sup>10</sup> could be characterized as a collection of common sense military tactics and strategies. Alexander the Great’s mastery of logistics and occupation strategies also evidence a high level of tacit knowledge.<sup>11</sup>

Similarly, the German’s concept of *Auftragstaktik* (or mission tactics) was drilled into every German soldier’s mind until it became automatic. (The modern US Army’s notion of “knowing the commander’s intent two levels up” is an extension of this concept.) Dupay argues that this empowering of the individual helps explain some of the success of the German Army and he illustrates his point with the following story.

To make perfectly clear that action contrary to order was not considered either as disobedience or lack of discipline, German commanders began to repeat one of Moltke’s favorite stories, of an incident observed while visiting the headquarters of Prince Frederick Charles. A Major, receiving a tongue-lashing from the Prince for a tactical blunder, offered the excuse that he had been obeying orders, and reminded the Prince that a Prussian officer was taught that an order from a superior was tantamount to an order from the King. Frederick Charles promptly responded, “His Majesty made

you a Major because he believed you would know when not to obey his orders.” This simple story became guidance for all following generations of Germans.<sup>12</sup>

General Chennault was nominated for (but did not receive) the Congressional Medal of Honor in 1942. Note the implied mastery Chennault had of his Japanese adversary’s tactics and capabilities.

His utter disregard of personal danger under heavy fire and aerial bombardment, and his calm judgment in each crisis has inspired his men, both Chinese and American. By his own intrepidity and valor he has learned Japanese tactics in such a manner that he is able to defend China with a force almost infinitesimal in comparison with the enemy. During the six months of combat he saw the [American Volunteer Group] destroy over three hundred Japanese aircraft while losing eight. He has subjected himself to over one hundred bombing raids in order to study the little known enemy tactics and to personally direct his Group when he was ordered by doctors that his flying leadership would be fatal to him. All of this action in China was for the purpose of learning tactics that would benefit his country.<sup>13</sup>

Because tacit knowledge is “domain-specific” or unique to a specific area, domain-specific measures must be constructed for use in each setting. Sternberg and his associates are currently involved in a project to develop a tacit knowledge measure for the military domain. Phase one of the project involved a literature review<sup>14</sup> and phase two involved officer interviews.<sup>15</sup> Unfortunately, phase three, the development of the measure, is not scheduled to be completed until summer 1997. In the absence of the military scale, and because of the universality of management practices, Dr. Sternberg recommended using the Tacit Knowledge Inventory for Managers (TKIM) in the present study.<sup>16</sup>

## **Learned Helplessness**

Nearly 30 years ago Martin Seligman formulated his theory of learned helplessness.<sup>17</sup> While a graduate student in experimental psychology he observed that some laboratory dogs who had been exposed to mild electric shocks (in conjunction with experiments) just stopped responding and lay whimpering in their cages, even when escape from the shock was available.<sup>18</sup> That is, they “learned” to be helpless. Parallels to human depression are obvious. A person trapped in abject poverty or an unhappy life circumstance, may be conditioned to just accept it, even though “escape” may be possible through advanced education, a career change, or professional help.

## **Learned Optimism**

Learned helplessness is only interesting here because it eventually led to the theory of learned optimism. Seligman and his associates noted that even under conditions of inescapable shock (i.e., the shuttle box exit was open for training but then closed while the animal received shock during the experiment) not all animals became helpless. In fact, about one in three animals did not. The helpless animals, who responded to inescapable shock by laying on the floor of the shuttle box and whimpering, made no effort to escape the shock when the door to the non-shocking side of the shuttle box was opened. The other one-third, however, immediately exited the shocked side as soon as the option was offered to them. These data confounded Seligman since they did not match his predictions. A host of new questions needed to be answered. Why did some animals not give up while others did? Did this phenomenon occur in humans? If so, could people be taught not to give up?<sup>19</sup>

Seligman's research eventually resulted in a theory of learned optimism which included three dimensions: permanence, pervasiveness, and personalization.<sup>20</sup> Permanence refers to the persistence one attributes to conditions. People who resist helplessness tend to believe the causes of bad events are temporary; the helpless tend to believe causes persist. Pervasiveness has to do with space. Those who resist helplessness believe problems are specific; the helpless tend to believe problems are universal in scope. Personalization, the third dimension, refers to whom people tend to attribute blame when bad things occur. Those who blame other people or circumstances (externalizers) have a higher self-esteem and less helplessness. Those who blame themselves when bad things occur (internalizers) tend to have lower self-esteem and more helplessness. Seligman developed the Attributional Style Questionnaire (ASQ) to measure these three dimensions.

### **The Metropolitan Life Study**

Does one's outlook on life really matter that much or is it just an interesting construct designed to keep psychologists busy and off the streets? Metropolitan Life Insurance Company wanted to know. They spent millions of dollars annually on training new life insurance salespeople. Unfortunately, even after pre-screening them with a Career Profile instrument developed by the industry, only a minority of their sales force were meeting sales expectations.

Seligman knew that successful life insurance salespersons needed a highly optimistic outlook to be successful. After all, they spend most of their day failing! Only a small percentage of ANY insurance salesperson's calls will result in a sale. What discriminates the successful from the unsuccessful is simply the quantity of calls a person is willing to



make. So he devised a study in which highly optimistic salespersons who would have not otherwise been hired by Met Life were hired and their results compared with the normal group of hired agents. The results are described below.

In early 1985, fifteen thousand applicants to Met Life nationwide took both the ASQ and the Career Profile. We had two goals. The first was to hire one thousand agents by the usual criterion, passing the Career Profile. For these thousand agents, the ASQ score did not enter into the hiring decision. We wanted only to see if the optimists on this regular force would go on to outsell the pessimists.

The second goal was much riskier for Met Life. We decided to create a “special force” of optimistic agents—applicants who had barely failed the Career Profile but had scored in the top half of the ASQ. Over a hundred agents who no one else would hire, because they failed the industry test, would be taken on. They would not know they were special agents. If this group failed utterly, Met Life stood to lose about three million dollars in training costs.

So one thousand of the fifteen thousand applicants were hired into the regular force; half were optimists and half were pessimists. (I said above that as a rule applicants are very optimistic. But of course, half the applicants fall below the average, some of them well below, which is where we found the pessimistic applicants.) And 129 more—all of whom had scored in the top half of the ASQ, and thus were genuine optimists, but had failed the Career Profile—were hired as well. They made up the optimistic special force.

Over the next two years the new agents were monitored, and this is how they did: In the first year, the optimists in the regular force outsold the pessimists, but only by 8 percent. In the second year, the optimists sold 31 percent more.

As for the special force, it did beautifully. They outsold the pessimists in the regular force by 21 percent during the first year, and by 57 percent in the second year. They even outsold the average of the regular force over the first *two* years, by 27 percent. In fact, they sold at least as much as the optimists in the regular force.

We also saw that the optimists kept improving over the pessimists. Why? Our theory had been that optimism matters because it produces persistence. At first, we expected, talent and motivation for selling should be at least as important as persistence. But as time goes on and the

mountain of no's accumulates, persistence should become decisive. This proved to be exactly the pattern.<sup>21</sup>

### **Athletic Performance**

The effect of optimistic thinking patterns affected athletic performance, too. Seligman asked the Berkley swimming team coaches and the swimmers to rate their swims for the season as “worse” or “better” than expected. The pessimists on the ASQ had about twice as many unexpectedly poor swims as the optimists did. The optimists lived up to their swimming potential and the pessimists fell below theirs.<sup>22</sup>

The ASQ scores also predicted how people would respond to defeat. “At the end of the season each swimmer swam one of their best events for time. The coaches told the swimmers that their time was between 1.5 and 5 seconds (depending on the distance) worse than it actually was. This amount of failure was chosen because they knew it would be very disappointing (one swimmer sat and rocked like a baby in a corner for 20 minutes afterwards), but undetectable as false. Each swimmer then rested and swam the event again as fast as he or she could. As we expected, the pessimists got worse. The optimists either held on or got even faster. The swimmers were, of course, debriefed afterwards.”<sup>23</sup>

### **Physical and Mental Health**

While some still cling to a dualistic belief that mind and body are separate and therefore do not influence each other, a burgeoning health psychology literature suggests otherwise.<sup>24</sup> A detailed review of this area is well beyond the scope of this paper, however, it is important to understand that optimism has been empirically linked to increased immune function and better health in longitudinal studies.<sup>25</sup> The implications for the warfighting commander who must send troops into highly stressful and dangerous

environments and yet still expect them to function at or above their peacetime performance levels are obvious.

### **Military Decision Making**

Satterfield and Seligman also demonstrated that an analysis of explanatory style could predict military-related behavior. Using explanatory style theory, they analyzed the statements made by George Bush and Saddam Hussein for periods preceding military actions or political conflict between 1979 and 1981. “Increased levels of optimism before conflict predicted heightened aggression and risk taking, whereas increased levels of pessimism prior to an event predicted passivity and caution.”<sup>26</sup>

### **Summary**

The two components of “military genius” are intellect and determination. While other psychological studies have examined the cognitive structures and responses of war fighters, none have tested Clausewitz’s theory of military genius. Both Tacit Knowledge and Learned Optimism are theory-driven, reliable, and well-validated constructs which appear to be promising measures of these components.

### **Notes**

<sup>1</sup> Rex Michael, *Military Command Decisionmaking Expertise: Final Report*. United States Army Research Institute for the Behavioral and Social Sciences, Technical Report 631, 1994.

<sup>2</sup> Jon J. Fallesen, Presentation at Principal Scientist Colloquium, Army Research Institute, 1996.

<sup>3</sup> Jon J. Fallesen, *Overview of Practical Thinking Instruction for Battle Command*. Research Report 1685, United States Army Research Institute for the Behavioral and Social Sciences, 1995.

<sup>4</sup> Robert J. Sternberg, Richard K. Wagner, Wendy M. Williams, Joseph A. Horvath, “Testing Common Sense.” *American Psychologist*. November 1995, p. 913.

<sup>5</sup> *Ibid.*, p. 912.

## Notes

<sup>6</sup> Ibid., p. 916.

<sup>7</sup> Sternberg et al., p. 921.

<sup>8</sup> Richard K. Wagoner and Robert J. Sternberg, "Practical Intelligence in Real-World Pursuits: The Role of Tacit Knowledge." *Journal of Personality and Social Psychology*, 1985.

<sup>9</sup> Andrea Eddy. *The Relationship between the Tacit Knowledge inventory for Managers and the Armed Services Vocational Aptitude Battery*. Unpublished Thesis, St. Mary's University, San Antonio, TX, 1988.

<sup>10</sup> Samuel B. Griffith, ed., *The Art of War*. (London: Oxford University Press, 1971).

<sup>11</sup> Donald W. Engels, *Alexander the Great and the Logistics of the Macedonian Army*. (Berkeley, CA: University of California Press, 1978).

<sup>12</sup> Dupay, p. 116.

<sup>13</sup> Brown, p. 36.

<sup>14</sup> Joseph A. Horvath, Wendy M. Williams, George B. Forsythe, Patrick J. Sweeney, Robert J. Sternberg, Jeffery A. McNally, and John Wattendorf. *Tacit Knowledge in Military Leadership: A Review of the Literature*. United States Army Research Institute for the Behavioral and Social Sciences, Technical Report 1017, 1994.

<sup>15</sup> Horvath, Joseph A., Forsythe, George B., Sweeney, Patrick J., McNally, Jeffery A., and Wattendorf, John, Williams, Wendy M., Sternberg, Robert J. *Tacit Knowledge in Military Leadership: Evidence from Officer Interviews*. United States Army Research Institute for the Behavioral and Social Sciences, Technical Report 1018, 1994.

<sup>16</sup> Robert Sternberg, personal communication, 29 September 1996.

<sup>17</sup> Martin E. P. Seligman, *Learned Optimism*. (New York: Alfred A. Knopf, 1991), p. 19.

<sup>18</sup> The typical Pavlovian conditioning paradigm involves placing an animal in a two chamber shuttle box. An opening connects the two sides of the shuttle box. Animals are typically exposed to a light or tone which is paired with a mild shock administered a few seconds later. When shocked, the animals will escape to the other (non-shocking) side of the shuttle box. Thus, the animal "learns," through classical conditioning, that a neutral stimulus (i.e., the light or tone) portends an aversive stimulus (i.e., the shock) and a trained animal will make its escape in the few seconds prior to the administration of the shock. The helpless animals fail to escape, even though they have repeatedly demonstrated their ability to do so in the past.

<sup>19</sup> Seligman, p. 30.

<sup>20</sup> Ibid., p. 44.

<sup>21</sup> Ibid., pp. 103-104.

<sup>22</sup> Ibid., p. 165.

<sup>23</sup> Ibid.

<sup>24</sup> Michael F. Scheier and Charles S. Carver, "Effects of Optimism on Psychological and Physical Well-Being: Theoretical Overview and Empirical Update." *Cognitive Therapy and Research*, Vol. 16:2, April 1992, pp. 201-228.

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<sup>25</sup> Leslie Kamen-Segel, Judith Rodin, Martin E. P. Seligman, and John Dwyer. "Explanatory Style and Cell-Mediated Immunity in Elderly Men and Women." *Health Psychology*, Vol. 10, pp. 229-235.

<sup>26</sup> Jason M. Satterfield and Martin E. P. Seligman. "Military Aggression and Risk Predicted by Explanatory Style." *Psychological Science*, Vol. 5:2, March 1994, p. 77.

## **Chapter 3**

### **Method and Hypotheses**

#### **Sample**

A sample of 75 mid-career officers (O-4s) in the 1996-97 class of Air Command and Staff College self-identified as having an interest in war gaming by volunteering for the Prairie Warrior (PW) elective.<sup>1</sup> Their service records were reviewed by the director of the project, Col Hall. Interviews were optional. Students were also free to submit a CV or other biographical information for review. The 20 PW participants were selected by Col Hall prior to collaboration with the author. They met weekly throughout the year with Col Hall to plan the air campaign.

All of the students who expressed interest in the PW elective were contacted by the author and invited to participate except for one student, an International Officer, for whom English was not his first language. All 20 of the PW selectees agreed to participate. Of the non-selectees, 37 agreed to participate and 34 completed and returned the questionnaire packet.

In addition to the students, a comparison sample of three senior officers (Col Hall and two other O-6 faculty members) were asked and consented to complete the questionnaire packet.

## **Instruments**

The instruments used in the study are included in Appendix A. All participants read and signed an informed consent document developed by the author. Additionally, subjects provided the requested demographic data and authorized ACSC to release their Myers-Briggs Type Indicator results to the author (or provided it themselves).

The Tacit Knowledge Inventory for Managers (TKIM) consists of 91 items which subjects rate on a seven-point Likert scale. Each of the items describes a managerial technique which subjects rate from “extremely bad” to “extremely good.” The items are allocated equally among three subscales: management of tasks, management of others, and management of self.

The Attributional Style Questionnaire (ASQ) is a 48-item scale consisting of various situations in which subjects might find themselves. For each item, subjects select the one answer (of two) which best describes the response they are likelier to have. The items are divided among Seligman’s three learned optimism factors: permanence, pervasiveness, and personalization, with half of each set of 16 items measuring “good” and the other half measuring “bad” qualities of each factor.

## **Procedure**

The research proposal for this project was approved by Major Winters, Faculty Research Advisor and by ACSC/DER. Approval to administer a survey was granted by ACSC/CVV.

In January 1997, Col Hall and the 20 PW selectees completed the questionnaire packet during a regularly scheduled weekly PW meeting. Non-selectees were solicited by

an electronic mail message. The two other O-6 subjects were personally invited to participate. All participating subjects returned their packets within two weeks.

The author met with Col Hall on several occasions to try to understand his selection criteria. All CVs and supplemental materials submitted by the students as well as Col Hall's notes and rank-ordering had been filed in a binder. These were made available to the author for review.

## **Hypotheses**

Col Hall stated he was attempting to select the "best" of the applicants. If he was successful, these subjects would be hypothesized to have higher levels of tacit knowledge and optimism than the non-selectees. No prior studies relating the Myers-Briggs types to war gaming variables were located, so no formal hypotheses were generated for this purely exploratory component of the study.

## **Notes**

<sup>1</sup> Prairie Warrior is a \$10 million joint services, computerized war gaming exercise held annually at Ft. Leavenworth, KS. The ACSC team is responsible for planning and executing the air campaign component of the war game.



## **Chapter 4**

### **Analyses and Results**

#### **Demographic Data**

The two subject groups were evenly matched on all demographic variables. Chi-Square analyses<sup>1</sup> for age, branch of service, total years of active military or reserve service, below-the-zone promotions, commander's jobs, years spent as a commander, joint jobs, years spent in joint jobs, formal education, and quantity and helpfulness of mentors were all non-significant. The two groups did not differ on gender composition, although there were four non-selected females versus none in the selectee group. Similarly, branch of service did not reach significance, although there were two Navy non-selectees versus no selectees. Finally, prior enlisted time nearly reached significance with three in the PW group and none among the non-selectees.

#### **Myers-Briggs Personality Types**

The groups did not significantly differ on any of the four personality type indicators.

#### **TKIM Computations**

Scoring the TKIM was more complicated since levels of tacit knowledge are relative. Thus, in keeping with Sternberg's protocol, scores from the "expert" comparison group

(i.e., the vocationally “successful” O-6s) were used as the “standard” to which the O-4 subjects were compared.

Among the O-6 subjects, inter-rater reliability on the 91 items was high. There was complete agreement among the three subjects on 20 of the items. Cronbach’s Alpha was computed for the other 71 items containing answer variability. Values of 0.938, 0.960, and .930 (for the “self,” “others” or “tasks” factors respectively) were obtained and deemed to be acceptable.<sup>2</sup> The mean value of the combined O-6’s scores was used as the criterion value for each of the 91 items. Subjects’ scores (S) for each of the 91 items were calculated by computing the absolute difference between the criterion value (C) and their response (R).<sup>3</sup> Smaller discrepancies (i.e., agreement) between the criterion value (C) and the subjects’ response (R) indicate higher levels of tacit knowledge.

### **ASQ Computations**

The ASQ was scored in accordance with Seligman’s protocol, yielding six subscale scores: permanence good (PmG) and bad (PmB), pervasiveness good (PvG) and bad (PvB), and personalization good (PsG) and bad (PsB). The three “good” and three “bad” scales were combined to produce “total good” (G) and “total bad” (B) scores respectively. A total optimism (O) score was computed using  $(G - B)$ . Finally a “hope” (HoB) score was computed using  $(PvB + PmB)$ . Smaller (B) scores and larger (G) scores indicate higher levels of optimism.

### **Tacit Knowledge (TKIM)**

The experimental hypothesis that PW selectees would evidence more tacit knowledge than the non-selectees was not supported. A series of Multivariate Analysis of

Variance (MANOVA) procedures conducted on the three factors were all non-significant. That is, none of the analyses revealed differences between the two student groups.

However, the O-6 criterion sample did differ significantly from both of the two student groups at the  $p < .05$  confidence level. As reported above, the three O-6 subjects in the criterion group had high agreement on the scale items. As expected, there was much less response variability among the members of the criterion sample than among the members of each of the two student samples.

**Table 1. TKIM Sample Means**

	<b>Self</b>	<b>Others</b>	<b>Tasks</b>
<b>Criterion O-6</b>	21.99 <sup>a</sup>	19.77 <sup>c</sup>	21.33 <sup>e</sup>
<b>PW Selectees</b>	34.02 <sup>b</sup>	42.58 <sup>d</sup>	31.53 <sup>f</sup>
<b>PW Non-Selectees</b>	31.16 <sup>b</sup>	42.67 <sup>d</sup>	33.17 <sup>f</sup>

**Note:** Groups having the same superscripts do not differ at  $p < .05$ .

### **Learned Optimism (ASQ)**

The experimental hypothesis that PW selectees would evidence more optimism than the non-selectees was not supported. Multivariate Analysis of Variance (MANOVA) conducted on all variables were non-significant. Similarly, the O-6 criterion sample did not differ significantly from either of the two student groups at the  $p < .05$  confidence level. However, even though the results failed to reach statistical significance, for the “permanence” and “pervasiveness” factors, a trend was observed in which the three O-6 subjects in the criterion group scored higher on the “good” scales and lower on the “bad” scales than either of the student groups. This effect was not present in the “personalization” factor.

### Notes

<sup>1</sup> All crosstabulated demographic and Myers-Briggs Type data are reported in Appendix B.

<sup>2</sup> Cronbach Alpha values should typically be greater than 0.900 for a scale to show good reliability.

<sup>3</sup> i.e.,  $S = |C - R|$

## **Chapter 5**

### **Discussion of Results**

The two student groups did not differ significantly on any demographic variables or on the MBTI. This is desirable since it means the groups did not differ on variables other than those being investigated. If they had, interpretation of the ASQ and TKIM results would have been more difficult.

While the experimental hypotheses predicting tacit knowledge or learned optimism differences between the selected and non-selected PW volunteers were not supported by the data, comparisons between the O-4 students and the O-6 faculty members were generally consistent with the theory underlying the ASQ and TKIM scales. This supports the author's belief that these variables may explain meaningful variance in a military population. However, more research is needed.

That the student groups failed to differ on the TKIM or ASQ is probably not surprising considering the high caliber of military officers in each group. While it is possible that these scales simply do not discriminate within a military population. The difference in scores (in the predicted direction) between the O-4s and the O-6s suggests otherwise.

A more likely explanation for the non-significant results is a statistical phenomenon known as "restriction of range." The MANOVA procedure is a "means test" (i.e., a test to

detect differences among the average value of each experimental group). However the mathematics of the procedure actually contrasts the variance (i.e., variability of scores around the mean) in each group. When the range of scores (i.e., the distance between the highest and lowest score) is artificially restricted (e.g., by ACSC admitting only the top 17 percent of O-4s) statistical power is reduced and real world differences can be masked (i.e., producing a false negative effect). Future studies might include a sample of O-4s who were not selected to attend PME in residence. This would provide a sample which better represented the actual military population. By extending the range of scores, the question of whether real differences exist could be better evaluated.

The TKIM scores may also have less robustly represented the actual level of tacit knowledge among the subjects because it is a business-oriented scale. In developing their theory, Sternberg and his associates noted that tacit knowledge is domain-specific. While there is overlap between business and military management principles, the empirical question of whether the TKIM measures military-related tacit knowledge has not been answered. Use of the military version of the tacit knowledge instrument (when published) would enhance the validity of future studies in this area.

Finally, the issue of how this sample compares to the published ASQ norms should be addressed. The mean score of subjects on both the permanence bad (PmB) and good (PmG) scales falls within the moderately optimistic range. These scores suggest that subjects perceive the causes of negative events to be temporary instead of permanent.

The results within the pervasiveness factor are consistently optimistic. Most subjects are moderately optimistic in regards to their beliefs about the causality of bad events (PvB). That is, they tend to attribute limited or specific explanations to negative

circumstances. This approach to bad events is helpful since it enables a person to recover quickly and move on, an asset in war fighting. Subjects in the study apply universal and wide-ranging explanations to good events (PvG). That is, they tended to see good outcomes as non-transitory. This belief tends to enable the positive spillover to other aspects of their lives. However, Seligman notes that individuals in certain jobs (such as defense attorneys) perform best when overly pessimistic, since this causes them to be cautious and thereby avoid catastrophic blunders. The average score for good pervasiveness falls within the moderately optimistic range.

The personalization factor is consistently pessimistic in the sample. Bad events (PsB) tend to be internalized. Seligman found a correlation between such internalization and lower levels of self-esteem. Good events (PsG), on the other hand, are attributed to external factors such as luck or other people.

The military tends to promote the idea that leader is responsible for failures and the team responsible for success. The emphasis placed on personal accountability with the accompanying call for some negative impact on the unlucky commander's career is only one recent example of this phenomenon. Thus, when things go wrong, someone must be held accountable, but when things go well, the expectation is that the kudos will be distributed throughout the organization. Future research could explore this phenomenon in greater detail than is possible in the current study.

The total bad (B), total good (G), and total optimism (O) scores provide a global measure of optimism across the combined permanence, pervasiveness, and personalization factors. As compared to Seligman's general population norms, subjects in the sample fall within the average range when encountering bad things. They score in the

low average range when encountering good things. The total optimism score falls within the moderately pessimistic range.

Seligman suggests that the hope score (HoB) may be one of the more important of all, since it correlates highly with the ability to handle high-pressured situations well. Subjects in this study fall within the moderately hopeful range, suggesting that they make a smaller number of permanent and universal attributions about bad events.

In conclusion, the results of this exploratory study suggest that the military could benefit from a more detailed study of both learned optimism and tacit knowledge. Many psychological variables like intelligence and personality type tend to be relatively fixed and immutable. Even if general officers tend to have higher IQs than the normal population and even if particular personality traits correlate better with military success, the current science's ability to modify either of these variables is limited.

However, some of the same characteristics that attracted the author to investigate optimism and tacit knowledge might just make them attractive to the average commander (in spite of the fact that they are psychological phenomena): (1) they are simple to understand and do not assume fluency in psychobabble, (2) they can be quickly and reliably assessed, and, *most* importantly, (3) they can be enhanced through education!

Psychologists have been training people with similar cognitive techniques for decades. As Fallesen has demonstrated, integrating a psychologically-oriented program into military PME is not conceptually difficult. Such a program could do for the warfighter's mind what logistics does for the knapsack. The real problem is determining how to convince PME curriculum planners that enhancing the tacit knowledge and



optimism of war fighters through educational inoculation would pay benefits on the battlefield. Hopefully this paper is the first step in that process.

The US military rightly spends millions of dollars annually to improve the knowledge base and skills of its members. History suggests that untrained fighting forces are rarely successful. Wouldn't DOD be better off if it spent more time and resources searching for military genius? Perhaps even Clausewitz would approve.

# **Appendix A**

## **Instruments**

## **Appendix B**

### **Crosstabulated Demographic and MBTI Data**

## *Glossary*

ACSC	Air Command and Staff College, Maxwell Air Force Base, AL
ASQ	Attributional Style Questionnaire
B	Global Bad Scale on the Attributional Style Questionnaire
G	Global Good Scale on the Attributional Style Questionnaire
HoB	Hope Scale on the Attributional Style Questionnaire
MANOVA	Multivariate Analysis of Variance
O	Total Optimism Scale on the Attributional Style Questionnaire
PmB	Permanence Bad Scale on the Attributional Style Questionnaire
PmG	Permanence Good Scale on the Attributional Style Questionnaire
PsB	Personalization Bad Scale on the Attributional Style Questionnaire
PsG	Personalization Good Scale on the Attributional Style Questionnaire
PvB	Pervasiveness Bad Scale on the Attributional Style Questionnaire
PvG	Pervasiveness Good Scale on the Attributional Style Questionnaire
TKIM	Tacit Knowledge Inventory for Managers

**Auftragstaktik.** From the German “mission tactics.” A subordinate commander is responsible for carrying out the mission concept of his commander whether he has orders or not and whether his latest orders apply to a changing situation.

**blitzkrieg.** From the German “Lightning War.” A Revolution in Military Affairs developed by Germany in World War II in which mechanized armor and infantry advanced rapidly on the enemy under the cover of close air support.

**MANOVA.** Statistical means test in which two or more analysis of variance procedures are performed simultaneously because of correlated dependent variables.

**thermonuclear.** Fusion-based weapons of mass destruction such as those dropped on Japan at the end of World War II.

**weltanschauung.** From the German “world view.”

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